# An Information System for Family Practice

## Part 1: Defining the Practice Population

J.P. Newell, MD, M.J. Bass, MD, MSc, and G.L. Dickie, MB, ChB
London, Ontario

Information systems for family practice are vital in its development as an academic discipline, in the teaching and learning process which ultimately improves the quality of care, and in the planning processes which must be used to rationalize the distribution of scarce resources in the health-care field. The provision of sufficient data for these purposes demands a flexible system, generally one based on the computer as a data storing and analyzing tool.

Such a system has been developed in the teaching practices of the Department of Family Medicine, University of Western Ontario; the methods employed and the uses for that system are to be described in a series of four papers. This first paper describes the methods developed for gathering demographic information on the practice population.

Information systems for family practice meet with variable approval from family physicians, though most of them will grant their essential nature in academic practices. Information systems are required in order to provide data descriptive of family practice and to assist in the planning of future developments in primary care.

In this series of four papers, the authors will describe the information system which has been developed for the Department of Family Medicine,
University of Western Ontario. This first paper will describe the background for the system and the methods used for gathering demographic data on the patient populations of the academic teaching practices. The second paper will describe some of the uses to which this demographic data can be put. The third and fourth papers will describe the methods used to gather encounter data, display some of that data, and offer a sampling of the multiple uses to which it can be put.

### Background and Objectives

This information system had its beginnings in early 1971, with the registration of patient populations in eight existing teaching practices. The perceived needs at that time were for
an age-sex register of the practice populations and for demographic data concerning patients and their households.

The system has evolved to a considerable degree since then, the major change being the addition of a system for collecting encounter data. Evolution has occurred in the area of intent as well. The system was developed initially for research purposes, but as its impact on teaching and learning has been felt, educational purposes have assumed a higher priority than research itself. Thus, in addition to providing demographic and morbidity information, the system is expected to provide feedback to health-care professionals regarding their performance and to provide information of value in clinical and operational auditing processes. The system has impact on undergraduate, postgraduate, and continuing medical education.

The system has two components: (1) *Household data information* — information concerning the patients and the families for which the teaching centers are responsible; and (2) *Visiting data information* — information concerning virtually all encounters between patients and health-care providers in the teaching centers.

The system depends upon the computer for data storage and analysis, and currently there are separate tape files for household and encounter information. These constitute a double sequential file, in which effective linkage is accomplished through the use of a unique patient identifier, a six-digit number which is present in each file.

# INFORMATION ON MEMBERS OF YOUR HOUSEHOLD

(Include anyone who lives and eats with you for more than six months of the year)

Family No.

(OFFICE USE ONLY)

**PLEASE PRINT EVERYTHING**

Your surname

Your address

Phone No.

Date of First Contact with Family Medical Centre: _____

Date Questionnaire Completed or Updated: _____

| | HEAD OF HOUSEHOLD 01 | 02 | 03 | 04 | 05 | 06 | 07 |
|---|---|---|---|---|---|---|---|
| FIRST NAMES — Print | | | | | | | |
| DATE OF BIRTH — In this order Day 8 Month 12 Year 70 | | | | | | | |
| SEX — M - Male F - Female | | | | | | | |
| SURNAME — give only if different from yourself. | | | | | | | |
| RELATIONSHIP TO YOURSELF — e.g., wife, father, boarder | | | | | | | |
| MARITAL STATUS — S - Single, M - Married, C - Common law, W - Widowed D - Divorced, Sep - Separated | | | | | | | |
| COUNTRY OF BIRTH. If Canada or USA print Province or State. | | | | | | | |
| EDUCATION — give highest grade completed. | | | | | | | |
| FURTHER QUALIFICATION, e.g. R.N., Grade A Mechanic, B.A. | | | | | | | |
| OCCUPATION — If student put S. If retired give last occupation, and put R beside it. If unemployed give usual occupation and put U beside it. | | | | | | | |
| PLACE OF WORK | | | | | | | |
| RELIGION | | | | | | | |
| Put a "Y" for "Yes" if person's regular doctor is at Family Medical Centre — "N" for "No". | | | | | | | |
| SOCIAL INSURANCE NUMBER (if any) | | | | | | | |

☐ I do not have OHIP coverage at present.

OHIP NO.          Subscriber's Initials

☐ This No. covers ALL FAMILY MEMBERS listed above.

OR

☐ This No. only covers — _____

Fill this square in only if another listed family member has own OHIP No.

Subscriber's Initials

This OHIP No. covers — _____

NEXT OF KIN

NAME: _____

ADDRESS: _____

PHONE NO: _____

Figure 1.

No system can collect all the information in a form that will ensure its availability to answer every question that might be asked in the future. This system has been designed to collect routinely certain items of data, but with the flexibility to allow changes in response to new questions. For example, information on presenting symptoms and drugs prescribed has been collected during certain periods for special purposes. For retrospective studies, access is obtained to the clinical records through the unique patient identifier; this six-digit number preserves confidentiality of patient information in the system because it is the only way of identifying the individual.

## The Household Data System
### Background

Registration of households in the urban academic teaching practices began in April 1971, and approximately 1½ years were required to register the majority of the households. As new teaching practices were added to the Department, their practice populations were similarly registered and added to the file. The initial registration was done by mailed forms and telephone follow-up. Once an 80 percent return had been obtained by this method, further follow-up was deemed unrewarding and a decision was made that any further registrations would occur when a responsible adult member of the unregistered household appeared in the office. New families entering the practices were also registered in this way.

For the purposes of registration, the Department of Family Medicine includes as members of the household all individuals living under the same roof and sharing the same table for more than six months of the year. Though the majority of households are composed of nuclear families, this definition allows for household composition that may include other than the members of the nuclear family.

### Data Acquisition

On the first convenient occasion on which a responsible adult member of the household appears in the teaching center for a visit, the staff person responsible for registration completes a Household Data Sheet (Figure 1). No registration of any household takes place until either of the following conditions is satisfied: (1) at least one member of the household has been seen by a health-care professional at the center on at least two occasions, or (2) the household indicates its firm intention to make use of the facilities.

A vital part of the initial registration process is the assignment of unique identifying numbers to both the household and each individual within it. The household number is four digits in length, and the individual number is a two-digit suffix. Once assigned, neither of these can be altered or reassigned. Generally the head of the household gets the 01 suffix, but this is not a necessary convention. These numbers link together data in the Household Data System, the Encounter System, and the clinical record; the household number is used for filing clinical records, which are grouped into households.

### Updating

Because the development of an appropriate age-sex baseline requires regular and accurate updating, provision has been made to ensure that this occurs annually for each household. A responsible adult member is asked if any changes have occurred on the Household Data Sheet since the last completion. When an update occurs, the date on which it was accomplished is entered on the Household Data Sheet, and a colored dot — a different color for each year — is affixed to the outside of the household chart. The importance of a well-trained staff, who are supported and encouraged in this vital aspect of data gathering, cannot be overstated.

### The Household Data Sheet (Figure 1)

This is the source document used to create the Household Data File. It was designed in early 1970 and has undergone one minor alteration since then. The Household Data Sheet is a duplicate form, the original copy being retained and affixed to the inside of the front cover of the family folder, the duplicate copy being used for coding the information to be transferred to the Household Data File. One of the outstanding benefits of this sheet is that it provides the health-care professional with an "at a glance" profile of the entire household.

The Household Data Sheet is a somewhat complicated form and some of the bits of information it gathers have proven, through experience, to be of little or no value, eg, country of birth, religion, place of work, and educational status. At the next revision, the amount of data will be reduced and the form will be simplified to facilitate information gathering and coding of the information for transfer to the Household Data File.

The following specific details relate to the Household Data Sheet itself (Figure 1):

1. The household number goes into the upper left-hand corner.

2. Though the surname of the head of the household is on the sheet, only the location of the household is entered into the Household Data File, using census tracts for the urban centers and a 500-meter military grid for the rural teaching center.

3. The *Date of First Contact* is the date on which the first member of the household made his first contact. This date is used to determine the beginning of the responsibility of the center for the household, and it facilitates the estimation of population at risk for any time period.

4. Names and Telephone Numbers are not entered into the computer file; they are there for clinical and administrative reasons alone.

5. Date of Birth, Sex and Marital Status have all been found to be very useful variables.

6. *Regular Doctor at Family Medical Center* is an important individual variable. It signifies whether the individual family member uses the Center, and it is employed to extract from the Household Data File all household members who are actual users of the teaching center, ie, the population at

risk. The non-user members are grouped with users only for the purpose of examining the characteristics of user households as a group.

7. Social Insurance Number is frequently not available and has not been collected with any consistency.

8. OHIP Number (Ontario Health Insurance Plan) is recorded accurately because the Household Data Sheet is often the source of information for billing purposes. OHIP numbers also go into the Household Data File and may at some future date permit linkage between this file and the OHIP information files of the Ministry of Health for Ontario.

## Transfer of Information to the Household Data File

The newly completed or updated Household Data Sheet is separated, the top copy is affixed to the chart, and the duplicate copy goes to a coding clerk who ensures the completion of this sheet and then codes the information onto 80 column coding sheets. From these sheets, punched cards are created, and the cards are batch processed to create and update the Household Data File.

## The Household Data File

### 1. Medical Center Family Merge Update (MCFMU)

The computer program which creates and updates the Household Data File is written in a version of ANSI COBOL. The program was developed on a CDC 6400.

The generation of a new file involves the creation, on disc, of an "activity" file consisting of new information and updates to existing information, sequenced by household and individual numbers. The data on the "current" master file are inserted where appropriate. Then the new "current" file is created from the disc record.

Security procedures exist to prevent duplication of existing records and updating of non-existent records. If MCFMU encounters an irregularity during a run, the entire new data file is

rejected and a list of the errors is produced. There are no partial runs.

### 2. File Structure

The Household Data File currently consists of 80 character records. All of the records pertaining to one household are kept adjacent to one another in the file, and households are sequenced according to the four digit household number. Within each household grouping the records are kept in a fixed order, sequenced according to the two-digit individual suffix.

### 3. File Maintenance and Protection

The file is kept on a three-tape rotating system which means, at any one time, there are three versions of the file in existence. The most up-to-date version is called the "current" tape, and this tape would be used to develop an age-sex register or to provide other data concerning the registered patient population. The "back-up" tape contains the version of the file that was "current" before the last group of merges and updates. The "old" version of the file is kept on a third tape and bears the same relationship to the "back-up" tape as the "back-up" bears to the "current" tape.

### 4. Timing of File Changes

Merging and updating occurs twice during the year, once at midyear, and once at the end of the year. This was necessitated by the clumsiness of batch processing of small quantities of data.

The Household Data File identifies the time at which any household entered the practice, and also the time of completion, or most recent updating, of the household record. Households that have been inactivated, ie, that are no longer making use of the facility, are not wiped from the tape; they are retained, with the addition of an indication that they are no longer active.

## Conclusion

The Household Data System, developed for use by the Department of Family Medicine, University of Western Ontario, functions effectively and provides significant baseline information concerning the patient populations of the teaching centers. Its advantages are many, and relate to clinical, educational, research, and administrative activities in the Department. Its disadvantages stem from the time and personnel required to create and maintain an accurate and up-to-date file. A reduction in the amount of information gathered, and some simplification of procedures for data acquisition, would be necessary before such a system could be extended readily to a community practice.

Medical Center Family Merge Update (MCFMU) and the coding manual used to create the Household Data File, can be made available upon request. Though some of the results of analyses of the data contained in the Household Data System will be described in the second paper of this series, the computer programs used for those analyses will not be described, but can be made available on request.